DOCUMENT RESUME

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IDENTIFIERS	*Workplace Literacy

ABSTRACT

This document offers instructional materials for a 32-hour course on math operations involving graphs/statistics, measurement (English and metric), geometry, exponential notation, and scientific notation as applied in the workplace. The course was part of a workplace literacy project developed by Mercer County Community College (New Jersey) and its partners. The document begins with a description of the project, a course outline (including objectives, topical outline, textbook references, and list of supplies), and a pretest. The rest of the document consists of information sheets, exercises, and quizzes for learners. (CML)

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ED351581

BASIC MATH III FOR MANUFACTURING

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MERCER COUNTY COMMUNITY COLLEGE
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OVERVIEW OF WORKPLACE LITERACY PROJECT

Skills for Tomorrow, NOW

The Workplace Literacy Project resulted from a Department of Education grant, plus in-kind contributions from a partnership with General Motors Inland Fisher Guide Plant, Princeton Plasma Physics Laboratory, and St. Francis Medical Center. The project is an attempt to find solutions to the growing "skills gap" in industry today. More than 25 million Americans cannot read the front page of a newspaper. In addition, workers whose average ages are rising, must produce in a technological environment that may not have existed when they began working. This lack of knowledge makes it difficult to compete in a technologically changing workplace. Moreover, an increasing number of immigrants have entered the workforce with limited English communication skills. In response to this growing need, the Federal government provided a grant to Mercer County Community College and its partners to develop ways to enrich and expand employees' basic workplace knowledge. The aim of the project was also to improve the self-esteem of the participants.

Support for the project was solicited from all levels of company management and the unions. In addition, an advisory council, comprising key management and employees from each company determined the design, goals, and time-frame of the project. Each company provided a liaison person from their site, and MCCC hired a director to manage the program. Employee release time for classes was site-specific.

Participation in the program was voluntary. Information about classes was disseminated through company letters, flyers, union notices, notices included with paychecks, and open forums with supervisors and employees.

The ABLE test was used for normative pre and post testing. Other types of evaluations varied from course to course. MCCC counselors met with each student to discuss present and future educational objectives.

Courses were offered in reading, business writing, math, science, and English as a Second Language. In addition, there were workshops in problem solving, stress management, and other work survival skills. The curricula for the courses were customized for each worksite to be as job focused as possible.

It is our hope that this program will serve as a model for other organizations to empower their employees with the skills needed to succeed in the changing technological workplace, today and in the future.

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MATH III

COURSE OUTLINE

BASIC MATH III

Course covers statistics, measurement, geometry, and exponential notation, and scientific notation. Workplace applications are stressed.

OBJECTIVES

Upon completion of this course, students will be able to:

- Perform basic operations involving statistics
- Perform basic operations involving measurement
- Perform basic operations involving geometry
- Demonstrate an understanding of the basics of exponential notation and scientific notation
- Identify ways these concepts are used in the workplace

TOPICAL OUTLINE

- Graphs/statistics
- Measurement Systems: English (U.S.) + metric
- Geometry
- Exponential Notation/Scientific Notation

OTHER

- 32 hours

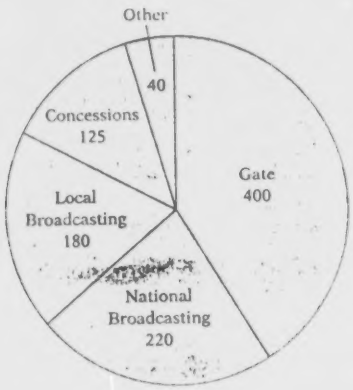
TEXTBOOK

Aufmann, R. and Barker, V., Basic College Mathematics, Houghton Mifflin, 1991.

PRE-TEST

The circle graph shows the income received from all the national football league teams.

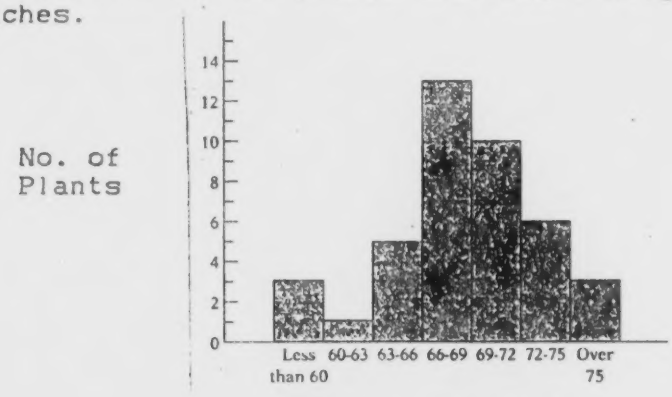
1. Find the football teams' total income.
2. What is the ratio of the income received from tickets sold at the gate to the income received from local broadcasting?
3. Find the percent of the total income received from national broadcasting. Round to the nearest percent.



Income for national football league
(in millions of dollars.)

The histogram shows the heights of 41 plants in a nursery.

4. How many of the plants were over 72 inches tall?
5. Find the ratio of the number of plants under 66 inches to the number of plants that were between 69 and 72 inches tall.
6. Find the percent of the plants that had a height between 66 to 69 inches.



7. Convert 17 ft to yards.

8. Convert 5 3/8 lb to ounces.

9. A book weighing 3 lb 2 oz is mailed at the postage rate of $0.17 per ounce. Find the cost of mailing the book.

10. A can of orange juice contains 16 fl oz. Find the number of quarts in a case of 24 cans.

11. Convert 4400 ft.lb./s to horsepower.
(1 hp = 55o ft.lb./s)

12. Convert 1.28 km to meters.

13. Convert 0.457 g to milligrams.

14. Convert 0.0045 L to millliliters.

15. A TV uses 140 W of energy. The set is on an average of 4 h a day in a 30-day month. At a cost of 8.5¢ per kilowatthour, how much does it cost to run the set 30 days?

16. Ham costs $3.50 per pound. Find the cost per kilogram.
(1 lb = 0.454 kg)

17. A right triangle has a 35 degree angle. Find the measures of the other two angles.

18. Find the perimeter of a rectangle with a width of 4 ft and a length of 9 ft.

19. Find the area of a circle with a diameter of 10 cm. Use pi = 3.14.

20. Find the volume of a rectangular solid with a width of 4 ft, a length of 9 ft and a depth of 3 ft.

21. Find the hypoteneuse of a right triangle with one leg equal to 3 cm and the other leg equal to 4 cm.

22. Triangles ABC and DEF are similar. Triangle ABC has a height of 4 in and BC is equal to 6 in. Triangle DEF has side EF equal to 12 in. What is the height of triangle DEF?

23. Convert to standard form: 9.37×10^{-2}

24. Convert to scientific notation: 824 = ?

25. Convert to scientific notation: 0.06 = ?

MATH III

Unit: Statistics

Lesson Objectives:

Upon completion of this unit students will be able to:

1. Answer questions concerning information presented on pictographs, circle graphs, bar graphs, broken line graphs, histograms, and frequency polygons.
2. Use information presented on a graph to solve math problems.
3. Prepare graphs based on given information.
4. Define the terms mean and median.
5. Find the mean of a set of numbers.
6. Find the median of a set of numbers.

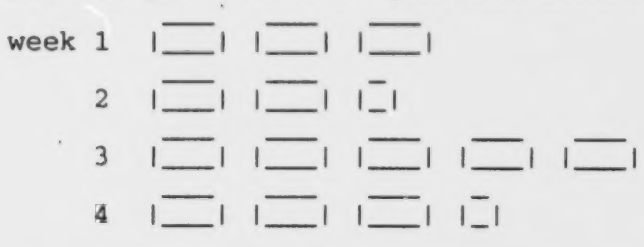
1. Pictographs, Circle Graphs

Read a pictograph
Read a circle graph
Find ratios, based on information in a graph
Find percentages, based on information in a graph
Prepare pictograph on given information
Prepare circle graph on personal information
Pay check : -- take home pay
-- federal tax
-- state tax
-- social security
-- savings plan
-- other

put percentages on graph, not dollar amount

EXAMPLES:

pictograph: amount of gasoline sold within a four week period



NOTE: |___| = 1000 gallons of gasoline

EXERCISES:
1) Find total number of gallons sold during the month
2) Find ratio of first week to third week
3) Find percent of gas sold each week

CARS SOLD

Friday

Saturday

Sunday

= 2 cars

EXERCISES:
1) Find the total number of cars sold
2) Find the ratio of a) Friday to weekend
   b) Sunday to weekend
3) Find percentage of Friday to total

EXAMPLES:

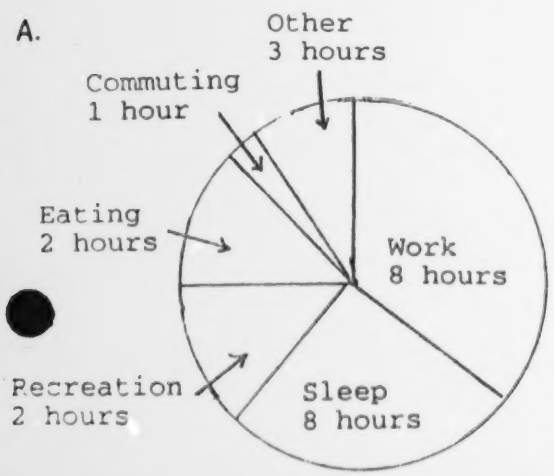
A. Circle Graphs: Activities of a 24 hour day where each section of the graph represents a time period of that day

Find ratio of:
- a) recreation to work
- b) work to total
- c) work to sleep

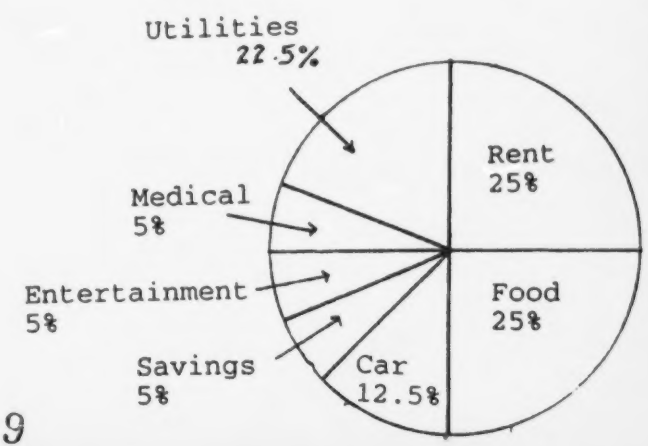
Find percentage of total time and compare to:
- a) recreation
- b) sleep

B. Circle Graph: percentage of budget spent on various expenses
If monthly income is $2,000, find the dollar cost of these:
rent, food, car, entertainment, etc.

A.



B.



2. Bar Graphs and Broken Line Graphs

Read a bar graph
Read a broken line graph
Find answers to specific questions regarding graph
Prepare bar graph
Prepare broken line graph

EXAMPLE: Bar Graph

Determine what the value of the ome is each year.

EXAMPLE: double bar graph

Find the difference betweeen the two years; among the quarters and between the years. Determine the profit for each quarter.

EXAMPLE: Broken line graph

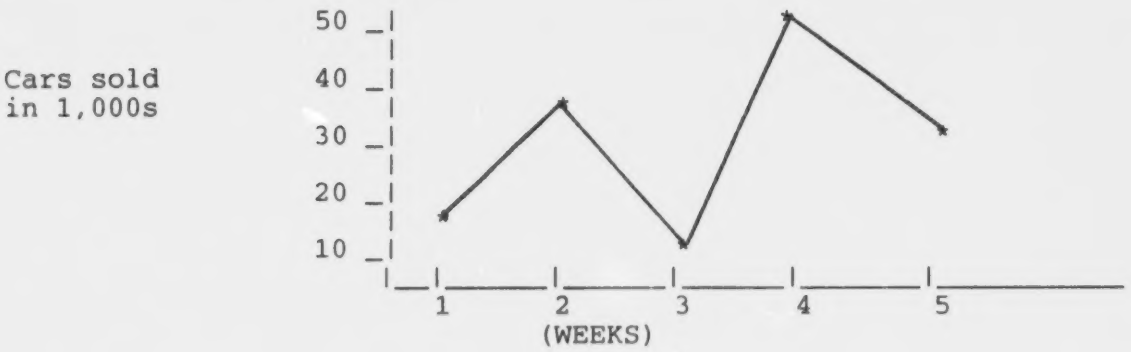
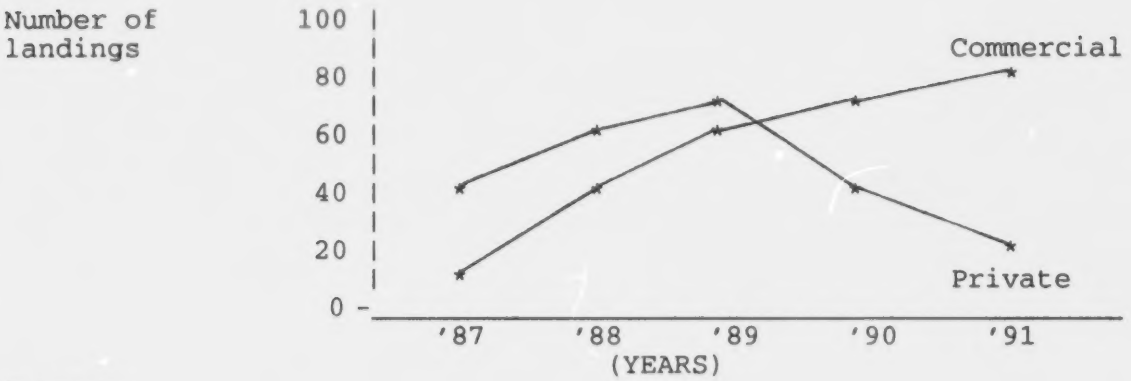


Figure:
a) cars sold by the week
b) greatest number
c) least number

EXAMPLE: two broken line graphs

Aircraft Landings at an Airport

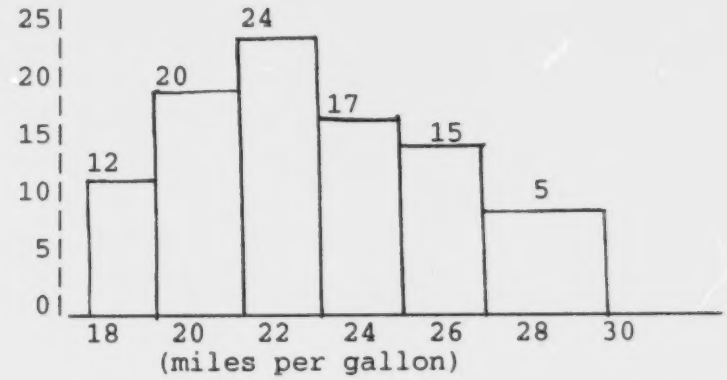


Compare:
a) landings in '88 and '89
b) commercial and private for the years
c) difference in total landings

Determine:
a) largest number of commercial flights; what year?
b) smallest number of commercial flights; what year?
c) same for private

3. Histograms and Frequency Polygons

EXAMPLES



Class Interval	Class Frequencies
18-20	12
20-22	19
22-24	24
24-26	17
26-28	15
28-30	5

Number of cars whose gas mileage is:
between 22-24 mpg.
over 25 mpg
less than 20 mpg

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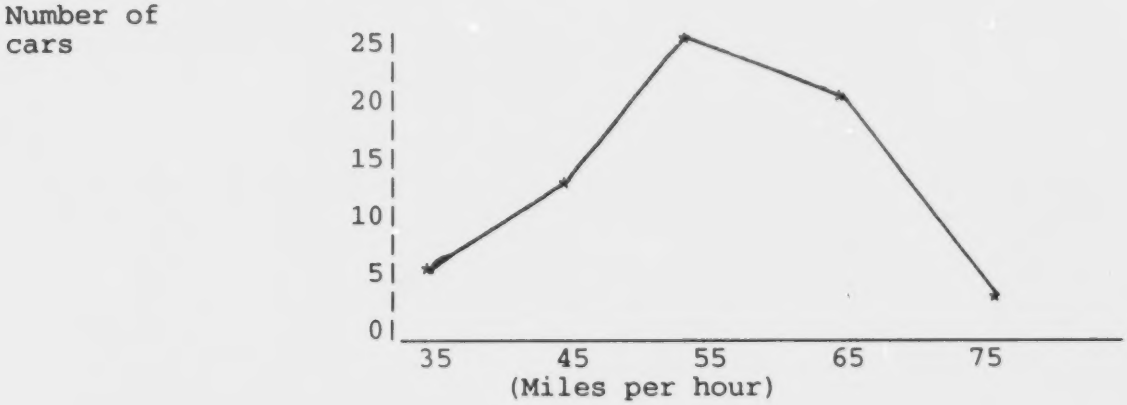


Class interval	Mid point	Frequency
30-40	35	7
40-50	45	13
50-60	55	25
60-70	65	21
70-80	75	4

4. Means and Medians

Mean = averages

Test scores: 86, 95, 94, 97, 93

To get the average or mean, add the numbers together and divide by the number of numbers that you are working with

$$\frac{86 + 95 + 94 + 87 + 93}{5} = \frac{455}{5} = 91$$

Median : middle score
reorder the numbers: 86, 87, 93, 94, 95

↓

middle score / median score

EXAMPLE: the ages of the departmental chairmen are as follows

54, 38, 62, 45, 56, 60, 59, 39, 60

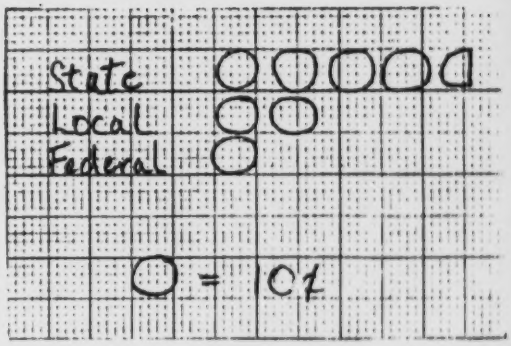
a) find the mean age
2) find the median age

EXAMPLE: test scores / finding the median with even numbers

58, 84, 89, 90, 92, 96

the median is the average of the two middle numbers
(89 + 90 = 179, then divide by 2 to get 89.5 median)

Of each dollar that a school receives, \$0.45 comes from that state government, \$0.20 from local sources, and \$0.10 from the federal government.

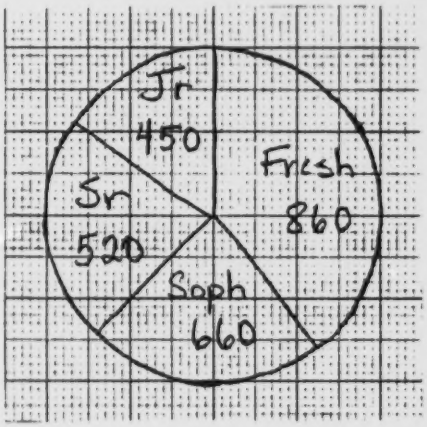


1. Find the ratio of the amount of money that comes from local sources to the amount that comes from the state.

2. Find the percent of the budget that comes from the federal government.

3. If the total budget is \$20,000,000, find the amount of the budget that comes from local sources.

The circle graph shows that number of students in each class in a small school.



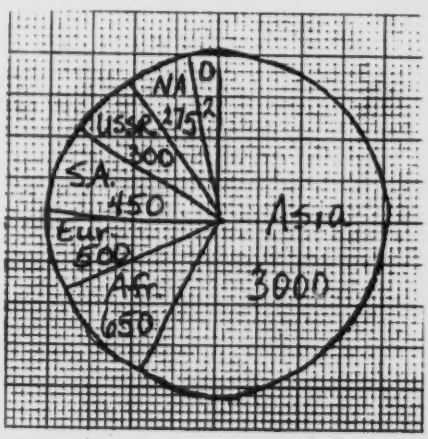
4. Find the total number of students attending the school.

5. What is the ratio of the number of students in the junior class to the total number of students?

6. What is the ratio of the number of senior students to the number of freshmen students?

7. What is the ratio of the number of students in the freshmen class to the number of juniors?

The circle graph shows the population of seven regions in millions of people.



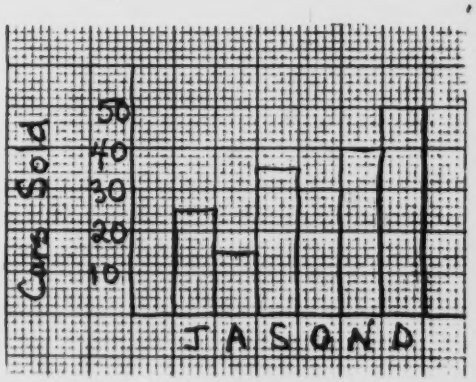
8. Find the total population of the seven regions.

9. What is the ratio of the population of Asia to the population of Africa?

10. What is the ratio of the population of North America to the population of Asia?

11. What is the ratio of the population of North America to the population of South America?

The bar graph shows the number of cars a corporation sold during the last 6 months of the year.



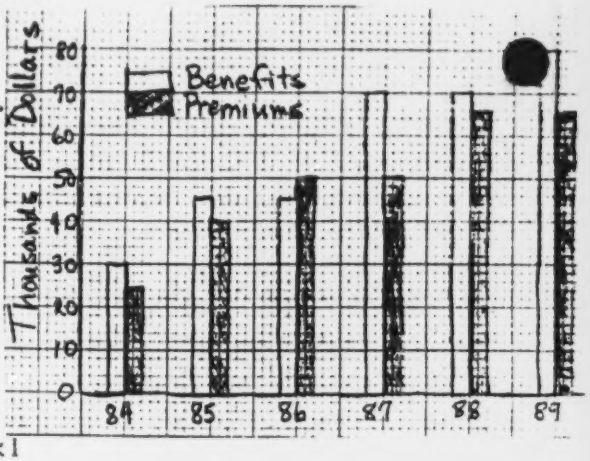
12. How many cars were sold in November?

13. How many cars were sold in August and September?

14. Find the ratio of the number of cars sold in August to those sold in December.

15. In which month was the greatest number of

The double bar graph shows the premiums earned and the benefits an insurance company paid during a 5-year period.



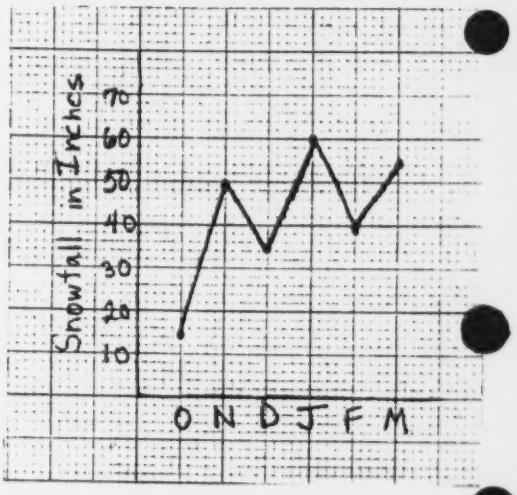
16. Find the amount of premiums earned in 1987.

17. Find the amount of benefits paid in 1989.

18. In what year did the amount of benefits exceed the premiums earned?

19. Find the difference in premiums earned and benefits paid in 1984.

The broken-line graph shows the snowfall at a ski resort during the ski season.



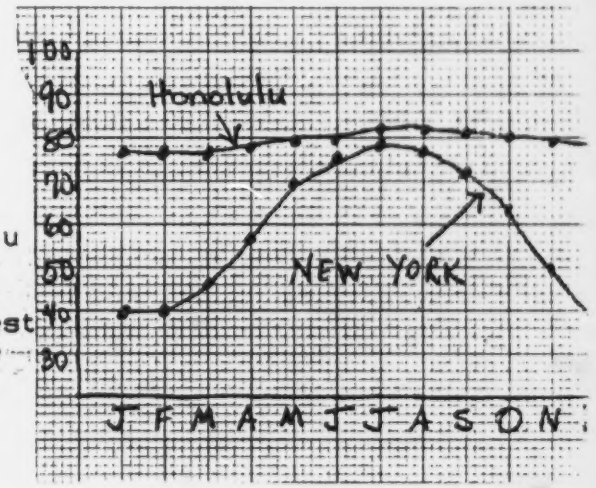
20. What was the amount of snowfall during January?

21. During which month was the snowfall the lowest?

22. What was the total snowfall during November and December?

23. Find the ratio of the amount of snowfall in December to the amount of snowfall during January.

The double-broken-line graph shows the average high temperature in Honolulu and the average high temperature in New York.



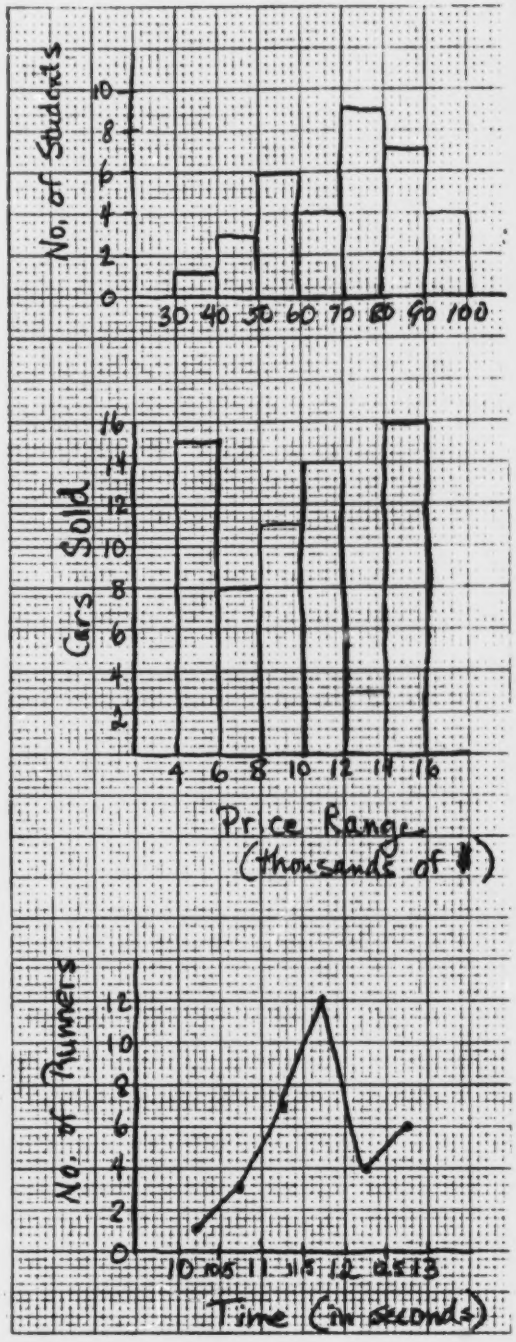
24. Find the average high temperature for New York during Janurary.

25. Find the average high temperature for Honolulu during January.

26. Find the approximate difference in the average high temperature during July for Honolulu and New York.

27. Find the approximate difference in the lowest average high temperature and the highest average high temperature for Honolulu.

The test scores of 34 students are recorded in the histogram.



1. How many students scored between 60 and 80?

2. Find the ratio of the number of students who scored between 50 and 60 to the total number of students.

3. Find the number of students who scored above 80.

4. Find the percent of the students who scored below 60. (Round to the nearest tenth of a percent.

The histogram shows the number of cars sold in different price ranges.

5. Find the total number of cars sold for more than $12,000.

6. Find the number of cars sold whose price was between $4,000 and $10,000.

7. Find the ratio of the number of cars sold that were priced between $6,000 and $8,000 and the number sold that were priced between $10,000 and $12,000.

8. What percent of the cars sold were priced over 000?

A total of 34 runners ran the 100 meter dash. The results are recorded.

9. How many runners ran the race in less than 11 seconds?

10. Find the ratio of the number of runners who ran the race between 10 and 11 seconds to the number who ran between 12 and 13 seconds.

11. How many runners ran the race between 11 and 12 seconds?

12. What percent of the runners ran the race in less than 11 seconds?

13. The prices of 1 pound of sirloin steak at six different stores were: $2.58. $2.62, $2.49, $2.75, $2.66 and $2.68. Find the mean price of the steak.

14. A taxi driver's records in the table show the number of gallons of gasoline purchased each day on the job last week. Find the mean number of gallons of gasoline purchased.

Wed	Thur	Fri	Sat	Sun
9.4	9.3	11.8	10.3	9.7

15. The number of hours of television 10 families watched during 1 day is recorded in the table. Find the mean number of hours of television the 10 families watched.

Family	Hours	Family	Hours
1	3.4	6	3.8
2	2.5	7	4.1
3	3.0	8	2.7
4	2.6	9	5.0
5	4.2	10	2.8

16. The hourly wages for seven job classifications at a company are $6.42, $9.24, $8.98, $6.38, $7.24, $6.26, and $7.16. Find the median hourly wage.

17. The number of requests for a conference room at a hotel during a 6-day period were 46, 18, 29, 48, 38, and 24. Find the median number of requests.

18. The populations of the ten largest cities in the world are shown below. Find the median population.

Buenos Aires 11,600,000	Sao Paulo 18,400,000
Calcutta 13,700,000	Seoul 12,300,000
Bombay 13,100,000	Shanghai 13,400,000
Mexico City 22,000,000	Teheran 11,300,000
New York City 15,700,000	Tokyo 21,000,000

The following test scores were recorded for ten students over a ten month period. Determine the mean and median. Prepare a circle graph which illustrates the percentage of A, B, C and D grades. Prepare a Bar Graph and a Broken Line Graph which illustrates the students' mean grades over time. Prepare a Double Bar Graph and a Double Broken Line Graph which illustrates Boys' vs. Girls' mean grades over time. Finally, prepare a histogram and a frequency polygon which illustrates an idea that you have.

	S	O	N	D	J	F	M	A	M	J
b1	80	82	84	86	88	90	92	94	96	98
b2	86	86	86	86	86	86	86	86	86	86
b3	96	94	96	94	96	94	96	94	96	94
b4	80	80	80	80	80	80	80	80	80	80
b5	60	62	64	62	64	62	64	62	64	60
g1	90	91	92	93	94	95	96	97	98	99
g2	85	85	85	85	85	85	85	85	85	85
g3	75	75	75	75	75	75	75	75	75	75
g4	70	71	72	73	74	75	76	77	78	79
g5	64	64	64	64	64	64	64	64	64	64

QUIZ: STATISTICS

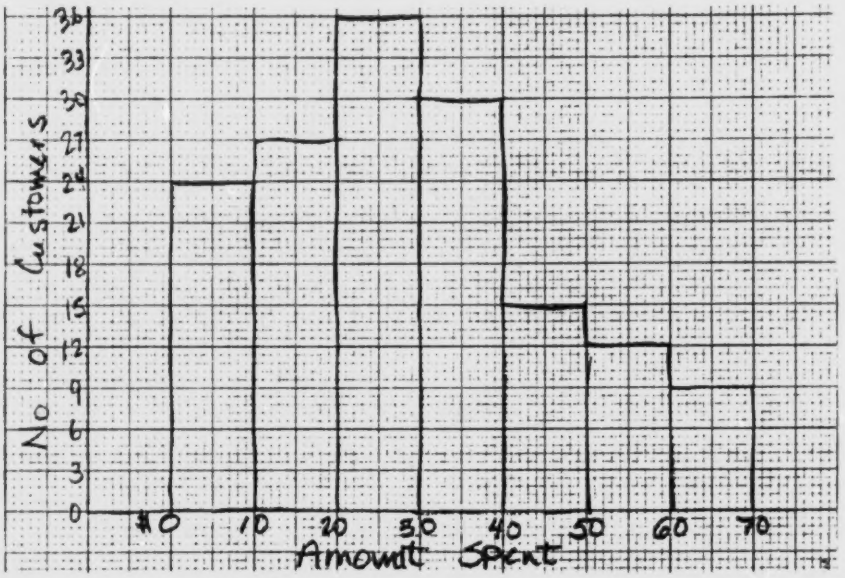
A department store keeps records of the amounts its customers spend. The histogram records the dollar amounts its customers spent.

1. How many customers made purchases between $30 and $40?

2. What is the ratio of the number of customers whose purchases were between $20 and $30 to the total number of customers?

3. How many customers made purchases of more than $40?

4. What percent of the total number of customers spent more than $50? Round to the nearest tenth of a percent.



5. During the past year, six houses in a small town sold for the following prices: $76,500, $117,395, $248,200, $83,900, and $178,300. Find the mean price of a house is this town.

6. The ages of the seven most recently hired employees at a company are 25, 44, 21, 24, 23, 31, and 34. Find the median age.

7. The number of tickets eight police officers gave out during a day were 16, 4, 8, 9, 22, 4, 12, and 19. Find the median number of tickets given out.

MATH III

Unit: US Customary Measurement System

Lesson Objectives:

Upon completion of this unit students will be able to:

1. Identify units of measurement for length, weight, capacity, energy, and power in the U.S. system of measurement.
2. Convert one unit of measure to another.
3. Perform basic math operations using measures.
4. Solve application problems involving measurement.

U.S. Customary Measurement System

1. Length

Yard, feet, inches, mile

Unit Conversions:

12 inches = 1 ft.	12in = 1ft = 1		
3 ft. = 1 yd.	1ft = 12in		
36 in. = 1 yd.	3ft = 1yd = 1		
5280 ft. = 1 mile	1yd = 3ft		etc.

Convert 5yd to ft

$$\frac{5\text{yd}}{1} \times \frac{3\text{ft}}{1\text{yd}} = \frac{15\text{ft}}{1} = 15\text{ft}$$

Convert 5280ft to yd

$$\frac{5280\text{ft}}{1} \times \frac{1\text{yd}}{3\text{ft}} = \frac{5280}{3} = 1760\text{yd}$$

Convert 1 mile to inches in class

Arithmetic Operations

Division

Convert 17in = 1ft 5in

$$12\overline{)17}\quad 1,\ 12,\ 5$$

Convert 31ft = ___yd ___ft

Multiplication

$$\begin{array}{r} 3\text{yd}\ \ 2\text{ft} \\ \times 4 \\ \hline 12\text{yd}\ \ 8\text{ft} \\ +\ 2\text{yd}\ \ 2\text{ft} \\ \hline 14\text{yd}\ \ 2\text{ft} \end{array}$$

$$\frac{8\text{ft}}{1} \times \frac{1\text{yd}}{3\text{ft}} = \frac{8\text{yd}}{3} = 2\ 2/3$$

In class: 23/4ft x 3

Addition

```
  4ft  4in
+ 1ft 11in
  5ft 15in
  1ft  3in
  6ft  3in
```

In class:

```
  3ft  9in
+ 3ft  8in
```

Subtraction

```
  8    18
  9ft   6in
- 3ft   8in
  5ft  10in
```

In class:

```
  4ft  2in
- 1ft  8in
```

The floor of a storage room is being tiled. Eight tiles, 9inches square, fit across the width of the room. Find the width, in feet, of the storage room.

2. Weight

oz., lb., ton

Unit Conversion

16oz = 1lb
2000lb = 1ton

Convert 62oz to lbs $\quad \frac{62\text{oz}}{1} \times \frac{1\text{lb}}{16\text{oz}} = 37/8\text{lb}$

31/2tons to lbs $\quad \frac{7\text{tons}}{2} \times \frac{2000\text{lb}}{1\text{ton}} = 7000\text{lb}$

In class: 31lbs to oz
42oz to lb
4200lb to tons

Arithmetic Operations

Subtract:

```
  13    21
 14lb   5oz
- 8lb  14oz
  5lb   7oz
```

```
 7lb  1oz
- 3lb  4oz
```

Divide: 7lb 14oz | 3

Multiply: 3lb 6oz x 4

Four teachers spent their summer vacation panning for gold. How much money did each teacher receive if they found 1lb 9oz of gold. The price of gold = $525.80/oz.

3. Capacity

fluid ounce	=	fl oz		8oz	=	1c
cup	=	c		2c	=	1pt
pint	=	pt		2pt	=	1qt
quart	=	qt		4qt	=	1gal
gallon	=	gal				

Convert 36fl oz to cups

$$\overset{9}{36\text{fl oz}} \times \frac{1\text{c}}{\overset{2}{8\text{fl oz}}} = 9\text{c} = 4\,1/2\text{c}$$

Convert 3qt to cups

$$\frac{3\text{qt}}{1} \times \frac{2\text{pt}}{1\text{qt}} \times \frac{2\text{c}}{1\text{pt}} = 12\text{c}$$

Convert 42c to quarts
18pt to gal

$$\begin{array}{r} 4\text{gal}\ \ 1\text{qt} \\ -\ 2\text{gal}\ \ 3\text{qt} \end{array}$$

Divide: 4gal 2qt | 3

Five students are going backpacking in the desert. Each student needs 1qt of water per day. How many gallons of water should they take for a 3 day trip?

4. Energy and Power

Energy - ability to do work. It is stored in coal, gasoline, water behind a dam, in one's own body

Definition of a unit of energy:
Energy = lb x distance lifted

Foot Pound (ft lb)
energy required by your body to lift 1lb of weight a distance of 1 foot

To lift 50lb a distance of 5ft is:
50 x 5 = 250 ft lb of energy

British Thermal Units (BTU)

1BTU = 778 ft lb

Ratings of furnaces, air conditioners etc.

Convert 250 BTU to ft lbs

$$\frac{250\text{BTU}}{1} \times \frac{778\text{ft lb}}{1\text{BTU}} = 194{,}500\text{ft lb}$$

Convert 4.5 BTU to ft lbs

Find the energy required for a 125lb person to climb a mile-high mountain.

Find the energy required for a motor to lift 800lb through a distance of 16 ft.

A furnace is rated at 80,000 BTU per hour. How many ft lb of energy are released on 1 hour?

1 BTU = 778 ft lb

$$\frac{80{,}000\text{BTU}}{\text{hour}} \times \frac{778\text{ft lb}}{1\text{BTU}} = 62{,}240{,}000\text{ ft lb}$$

A furnace is rated at 56,000 BTU. How many ft lb of energy are released in one hour?

Power is the rate at which energy is released.
Measured in ft lb/sec

$$\frac{100.10}{10} = \frac{100 \text{ ft lb}}{\text{sec}}$$

$$\frac{100.10}{5} = \frac{2200 \text{ ft lb}}{\text{sec}}$$

$$1 \text{ Horsepower} = \frac{550 \text{ ft lb}}{\text{sec}}$$

Find the power needed to raise 300lb a distance of 30 ft in 15 sec

$$\text{Power} = \frac{30\text{ft} \times 300 \text{ lb}}{15}$$

$$= \frac{600 \text{ ft lb}}{\text{sec}}$$

A motor has a power of 2750 ft lb. Find the horsepower of the motor.
s

$$\text{Horsepower} = \frac{550 \text{ ft lb}}{\text{sec}}$$

$$\frac{2750}{55o} = 5\text{hp}$$

$$\frac{2750 \text{ ft lb}}{1 \text{ sec}} \times \frac{1\text{hp}}{550 \text{ ft lb}} = \frac{2750}{550} = 5\text{hp}$$

Find the power needed to raise 1200 lb a distance of 90 ft in 24 sec

A motor has a power of 3300 ft lb. Find the horsepower of the motor.

Convert:

1. 7 ft = _____in
2. 58 in = _____ft
3. 12 ft = _____yd
4. 4 yd = _____in
5. 3 mi = _____ft
6. 3 1/4 ft = _____in

Perform the indicated operation:

7. 150 in = _____ft_____in
8. 4 ft 9 in + 2 ft 5 in
9. 8 yd 1 ft - 4 yd 2 ft
10. 15 1/2 in 3
11. 4 ft 8 in 5

12. A kitchen counter is to be covered with tile that is 4 inches square. How many tiles can be placed along one row of a counter top that is 6 ft 8 in long?

13. A board 5 2/3 ft is cut into 3 equal pieces. How long is each piece?

14. A roof is constructed with nine rafters, each rafter 6 ft 5 in long. Find the total number of feet of material needed to build the rafters.

Convert:

15. 48 oz = _____lb
16. 8 lb = _____oz
17. 5 tons = _____lb
18. 75 oz = _____lb
19. 1 7/10 tons = _____lb
20. 7000 lb = _____tons

Perform the indicated arithmatic operation:

21. 11000 lb = _____tons_____lb
22. 5 lb 9 oz + 2 lb 13 oz
23. 4 tons 600 lbs - 2 tons 900 lbs
24. 4 lb 8 oz 4
25. 4 lb 8 oz 4
26. 6 5/8 lb - 3 5/6 lb

27. A machinist has 24 rods to mill. Each rod weighs 20 oz. Find the total weight of the rods in lbs.

28. A baby weighed 8 lbs 8 oz at birth. At 6 months of age, the baby weighed 16 lbs 2 oz. Find the baby's increase in weight during the 3 months.

Convert:

1. 60 fl oz = _____ cup
2. 2 1/2 cup = _____ fl oz
3. 3 1/2 pt = _____ cup
4. 10 qt = _____ gal
5. 7 1/2 pt = _____ qt
6. 1 1/2 pt = _____ fl oz

Perform the arithmetic operation.

7. 14 qt = _____ gal _____ qt
8. 3 gal 2 qt + 4 gal 3 qt
9. 3 c 3 fl oz - 2 c 5 fl oz
10. 2 qt 1 pt $\times$ 5
11. 6 gal 1 qt $\div$ 5

12. It is estimated that 60 adults with attend a social. Assume that each adult will drink 2 c of coffee. How many gallons of coffee should be prepared?

13. A gasoline tank holds 10 1/2 gal of gas. How many quarts of gasoline does the gasoline tank hold?

14. A department store buys hand-lotion in 5-qt containers and then repackages the hand lotion in 8 fl oz bottles. The hand lotion cost $41.50 and each 8 fl oz bottle is sold for $4.25. How much profit is made on each 5 at package of hand lotion?

Convert:

15. 25 BTU = _____ ft lb
16. 40,000 BTU = _____ ft lb

17. Find the energy required to lift 150 lb a distance of 10 ft.

18. Find the energy required to lift a 3300-lb car a distance of 9 ft.

19. A crane lifts an 1800-lb steel beam to the roof of a building 36 ft high. Find the amount of energy the crane requires in lifting the beam.

20. A furnace is rated at 22,500 BTU per hour. How many foot pounds of energy does the furnace release in 1 hour?

21. Find the amount of energy in foot pounds given off when 1 lb of gasoline is burned. 1 lb of gasoline gives off 21,000 BTU of energy when burned.

22. Convert 1100 ft lb/s to horsepower.

23. Convert 1650 ft lb/s to horsepower.

24. Conver 5 hp to foot pounds per second.

25. Find the power in foot pounds per second needed to raise 125 lb a distance of 12 ft in 3 s.

26. Find the power in foot pounds per second needed to raise 12,000 lb a distance of 40 ft in 60 s.

27. A motor has a power of 16,500 ft lb/s. Find the horsepower of the motor.

28. A motor has a power of 4400 ft lb/s. Find the horsepower of the motor.

QUIZ: U.S. CUSTOMARY SYSTEM

1. Multiply 2 ft 7 in by 5

2. A board 5 ft 10 in is cut from a board 12 ft 4 in long. What is the length of the remaining piece of board.

3. Convert 3 3/8 lb to ounces.

4. Add 5 lb 10 oz to 2 lb 9 oz.

5. Convert 3 1/2 pt to fluid oz.

6. A cafeteria sold 256 cartons of milk in one school day. Each carton contains 1 cup of milk. How many gallons of milk were sold?

7. Convert 2850 ft lb/s to horsepower. (1 hp = 550 ft lb/s)

8. Find the power in ft lb/s of an engine that can raise 800 lbs to a height of 15 ft in 25 seconds.

MATH III

Unit: Metric Measurement System

Lesson Objectives:

Upon completion of this unit students will be able to:

1. Identify units of measurement for length, weight, capacity, energy, and power used in the metric system.
2. Convert one unit of measure to another.
3. Perform basic math operations using measures.
4. Solve application problems involving measurement.
5. Convert metric to U.S. and U.S. to metric measurements.

Metric Measurement System

Length

Meter - 1 yd. or 39"

kilo = 1000	1 kilometer (km) = 1000 m
hecto = 100	1 hectometer (hm) = 100 m
deca = 10	1 decameter (dam) = 10 m
	1 meter (m) = 1 m
deci = .1	1 decimeter (dm) = .1 m
centi = .01	1 centimeter (cm) = .01 m
milli = .001	1 millimeter (mm) = .001 m

km hm dam m dm cm mm

Convert 4200 cm to m

move 2 places to left

4200 cm = 42 m

.38 m to mm = 380 mm

3.07 m to cm = 307 cm

Convert 8 km 32 m to km

↓

32 m = .032 km

8 km . 032 km = 8.032 km

Change to a single unit of measure before add, subt.

			m	cm
Add:	6m	42cm	6.42m	642cm
	+7m	98cm	+7.98m	798cm
			14.40m	1440cm

Preference:

Should change to larger units of measure

A bookcase 1m 75cm long has 4 shelves. Find the cost of shelves when the price of lumber is $11.75 per meter.

$100	$10	dollar	dime	penny	mil
100	10	1	.1	.01	

Difference

1 = ? dimes

10 dimes

$1 = ? pennies

100 pennies

$10 = ? pennies

Mass

gram

Kg hg dag g dg cg mg

Convert 324 g to kg = .324 kg

Convert 4.23 g to mg = 4230 mg
42.3 mg to g = .0423 g

Convert 2 kg 564 g to kg

3 g 54 mg to mg

Add 3 kg + 62 g
Multiply 4 g 620 mg x 8
} express as a single unit

Find the cost of a roast weighing 3 kg 320 g if the price per kg is $4.17. Round to nearest cent.

Capacity

Liter

Kl hl dal L dl cl ml

824 ml = L

Convert: 4 L 32 ml to L.

2 kl 167 L to L.

1.23 L L to ml

325 ml to L.

Multiply 4 L 147 ml x 9

Divide 22 kl 992 L ÷ 12

A lab assistant must order acid for three chemistry classes of 30 students each. Each student needs 80 ml of acid. How many Liters of acid should be ordered?

Energy

Calorie = amount of energy that will raise the temperature of 1 kg of water 1 degree Celsius

= energy required to lift 1 kg a distance of 427 meters

Swimming uses 180 calories per hour. How many calories are used swimming 1/2 hr. each day for 30 days?

Watthour = amount of energy required to lift 1 kg a distance of 370 m.
Light bulb @ 100 W will emit 100 watthours of energy each hour.

1000 watthours = 1 kilowatt hour

1000 Wh = 1 kWh

A 150-W light bulb is on for 8 hrs. At $.08 per kWh, find the cost of the energy used.

$$\begin{array}{r} 150 \quad W \\ \underline{\times 8} \times hr \\ 1200 \quad Whr \end{array}$$

1200 Whr = 1.2 kWh

1.2 x $0.08 = $0.096

cost of energy

Walking uses 180 calories per hour. How many calories will you burn off by walking 3/4 hour each day for 1 week?

Housework requires 240 calories per hour. How many calories are used in 5 days by doing 1 1/2 hour of active housework per day?

An iron is rated at 1200 W. If the iron is used for 1.5 hours, how much energy is used in kW hr?

A TV set is rated at 1800 W, is on 3 1/2 hrs./day at 7.2 cents/kW hr. Find the cost of operating the set for 1 week. Round to nearest cent.

Conversion Between U.S. and Metric Systems

Length	Weight	Capacity
1m = 3.28 ft.	28.35 g = 1 oz.	1 L = 1.06 qt.
1cm = 0.39 in.	454 g = 1 lb.	
1.61 km = 1 mi.	.454 kg = 1b.	
0.91 m = 1 yd.	1 kg = 2.2 lb.	
0.305 m = 1 ft.		
2.54 cm = 1 in.		
1 m = 1.09 yd.		

Convert 4 gallons to Liters

$$\frac{4 \text{ gal.}}{1} \times \frac{4 \text{ qt.}}{1 \text{ gal.}} \times \frac{1 \text{ L}}{1.06 \text{ qt.}} = \frac{16 \text{ L}}{1.06}$$

$$1.06\overline{)16.00.00} = 15.09$$

106
540
530
1000
954

= 15.1 L.

Convert 10 c —> L (nearest 100th)

200 m —> feet

45 mph —> kmph

90 kmph —> mph

60 ft/s —> mps

$0.372/L —> $/g

$1.52/gal. —> $/L.

Convert:

1. 32.5 km = _____ m

2. 3.21 m = _____ cm

3. 42 cm 6 mm = _____ mm
   = _____ cm

Perform the arithmetic operation.

4. 42 cm + 8 m

5. 2 km - 435 m

6. 3 km 726 m X 9

7. A carpenter needs 15 ceiling joists, each joist 4 m 60 cm long. Find the total length of ceiling joists needed in meters.

8. A bicycle race had two checkpoints. One checkpoint was 12 km 400 m from the starting point. The second checkpoint was 9 km 300 m from the first checkpoint. The second checkpoint was 8 km 800 m from the finish line. How long was the race?

9. During the week, a cross-country runner ran 12 km 500m, 15 km 800m, 12 km 500 m, 13 km 200 m, and 18 km 400 m during the week. Find the average distance run each of the 5 days.

Convert:

10. 420 g = _____kg

11. 325 g = _____ mg

12. 3 kg 922 g = _____kg
    = _____g

Perform the arithmetic operation. Round to the nearest thousandth.

13. 4 g - 692 mg

14. 4 kg + 692 g

15. 46 g X 16

16. A doctor advises a patiet weighing 108 kg 400 g to lose 20 kg of weight. How much more does the patient need to lose after losing 13 kg 800 g?

17. Five scouts are taking 104 kg 600 g of supplies on a 5 day backpacking trip. How much weight in kilograms will each scout carry if the gear is divided equally?

18. Find the cost of a ham weighing 4 kg 700 g if the price per kilogram is $4.20.

1. 4200 ml = _____ L 2. 0.037 L = _____ ml

3. 3 L 42 ml = _____ L
   = _____ ml

Perform the arithmetic operation.

4. 8 L 163 ml + 4 L 275 ml 5. 4 L 792 ml / 4

6. 10 L 72 ml - 3 L 818 ml

7. A can of tomato juice contains 1260 ml. How many 180 ml servings are in one can of tomato juice?

8. There are 24 bottles in a case of shampoo. Each bottle of shampoo contains 320 ml. Find the number of liters in one case of shampoo.

9. A pharmacy buys cough syrup in 5 L containers and repackages the syrup in 250 ml bottles. Thirteen bottles of syrup have been sold. How many bottles of the syrup are still in stock?

10. You omit one egg containing 75 cal from your usual breakfast. If you continue this practice for 90 days, how many calories will you omit from your diet?

11. A person needs 15 cal per pound of body weight to maintain his weight. How many calories would a 135 lb person require per day?

12. It is recommended that 55% of the daily intake of calories come from carbohydrates. Find the number of calories from carbohydrates needed if you limit your calorie intake to 1600 calories.

13. Cycling at 8 mi per hour requires 320 cal/hr. If you ride a bicycle for 1 1/2 hr per day for 5 days/week, how many calories do you burn up in 4 weeks?

14. Find the cost of 560 kWh of electricity at $0.092/kWh.

15. A 120-W bulb is kept burning 24 hr/day. How many kWh of electrical energy are used in 1 day?

16. How much does it cost to run a 2200-W air conditioner for 8 hr at $0.09/kWh?

17. A space heater is used for 3 hr. The heater uses 1400 W per hour. Electricity cost $0.111 per kWH. Find the cost of using the heater.

18. A household uses an average of 16.3 kWh of electrical energy each day. Electrical energy costs $0.102 per kWh. Find the cost of using electrical energy for 31 days in this household.

Convert:

19. 6 ft 4 in = _____ m 20. 14.3 gal = _____ L

21. 65 mi/h = _____km/h 22. 100 m = _____ ft

    48 L = _____ gal 24. 35 mm = _____ in

25. Swimming requires 550 cal per hour. How many pounds could be lost by swimming 1 1/2 hr each day for 5 days if no extra calories were consumed? (3500 cal = 1 lb)

26. A shipment of steel weighs 114,000 kg. Convert this weight to tons

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QUIZ: METRIC SYSTEM

1. Convert 0.38 cm to mm.

2. Subtract 56 cm 3 mm - 35 cm 8 mm

3. Multiply 3 kg 450 g by 11

4. Find the total cost of a 7 kg 300 g turkey costing $2.79/kg. Round to the nearest cent.

5. Divide 45 L 250 ml by 25.

6. Convert 0.0056 L to ml.

7. A large egg contains 90 cal. How many calories can be elimiated from your diet in one month by eliminating one large egg per day from breakfast.

8. A TV uses 240 W of energy. The set is on an average of 5 hr/day in a 30 day month. At a cost of $0.095/kWh, how much does it cost to run the set for 30 days?

9. Convert a 1000 m run to yards.

10. A backpack tent weighs 1.90 kg. Find the weight in pounds. Round to the nearest hundredth.

MATH III

Unit: Geometry

Lesson: Angles and Lines

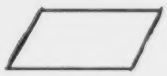
Lesson Objectives:

Upon completion of this lesson students will be able to:

1. Define and describe angles and lines.
2. Identify and be able to find types of angles - right, complementary, straight, supplementary, acute, and obtuse, vertical, and adjacent.
5. Identify and define perpendicular and intersecting lines.
6. Identify alternate interior and exterior angles, and corresponding angles.
7. Solve problems involving angles and lines.

GEOMETRY

1. Angles, Lines and Geometric Figures

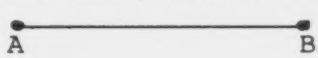
Plane - flat surface "plane figure" 

Space - extends in all directions

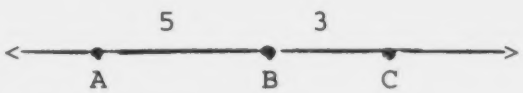
Solids - objects in space (trees, doors, ice cubes)

Line - extends indefinitely in two directions, in a plane

Line Segment - part of a line, has two end points defined as $\overline{AB}$



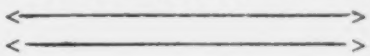
Given:



then $\overline{AC} = \overline{AB} + \overline{BC}$

if $\overline{AC} = 52$ and $\overline{AB} = 40$ $\overline{BC} = ?$

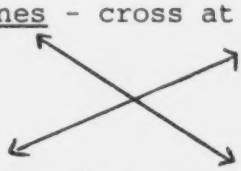
Parallel Lines - never meet, distance between is always the same



$AB \parallel CD$

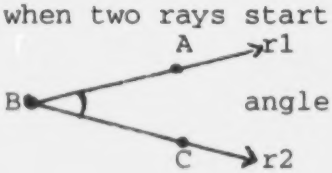
then $p \parallel q$

Intersecting Lines - cross at one point in the plane



Ray - starts at a point, continues indefinitely

Angle - formed when two rays start at the same point

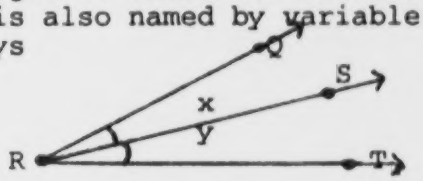


Vertex - common endpoint of the two rays

$\angle B$ or $\angle ABC$

angle is named for the vertex!

Angle is also named by variable written between the rays



Name the angles: $\angle QRS$ or $\angle SRQ$ or $\angle x$
$\angle SRT$ or $\angle TRS$ or $\angle y$

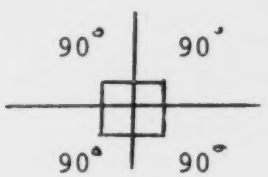
NOT $\angle R$, cannot be used to name the angle

Angles are measured in degrees (°)

One complete revolution = 360°

1/4 of a revolution = 90°
Right Angle

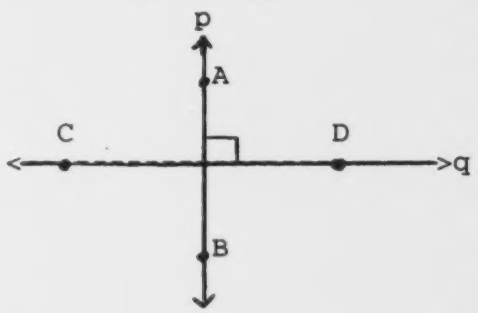
Perpendicular Lines
intersecting lines
which form right angles



=360°

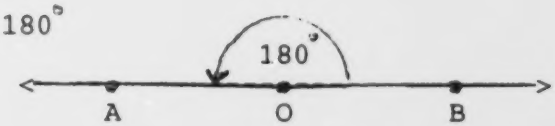
$\perp$ (symbol)

AB $\perp$ CD
CD $\perp$ AB
p $\perp$ q



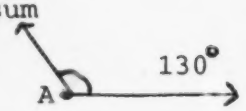
Complementary Angles
two angles whose sum is 90°

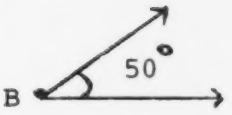
Straight Angle
1/2 of a revolution = 180°



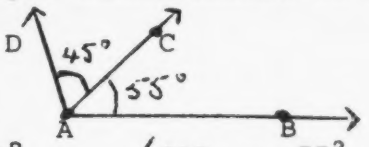
AOB = 180°

Supplementary Angles
two angles whose sum is 180°





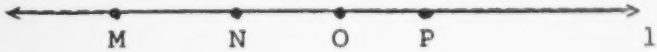
Acute Angle - angle whose measure is between 0° and 90°
Obtuse Angle - angle whose measure is between 90° and 180°



$\angle DAC = 45^\circ$ $\angle CAB = 55^\circ$
$\angle DAB = \angle DAC + \angle CAB = 45^\circ + 55^\circ = 100^\circ$

Problems In Class

Give: MN = 15, NO = 18, MP = 48, find OP

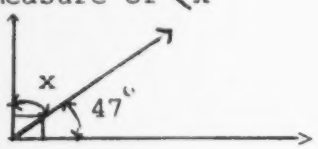


(OP=15)

Find the complement of a 32° angle (58°)

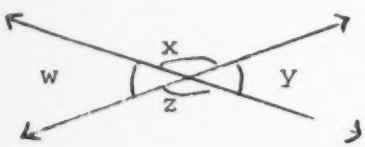
Find the supplement of a 105° angle (75°)

Find the measure of $\angle x$



(43°)

Solving problems with angles forming intersecting lines:



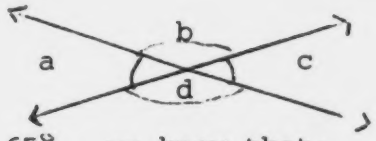
$\angle w$ & $\angle y$ are acute
$\angle x$ & $\angle z$ are obtuse

Intersection of two lines cause vertical angles
w and y
x and z are vertical angles

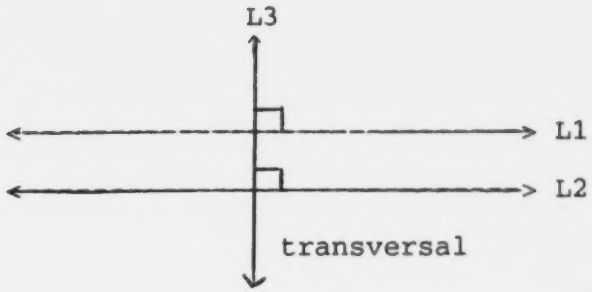
Two angles that share a common side are called adjacent angles
w & x, x & y, y & z, z & w
are adjacent angles

vertical angles
are equal angles

adjacent angles
are supplementary angles

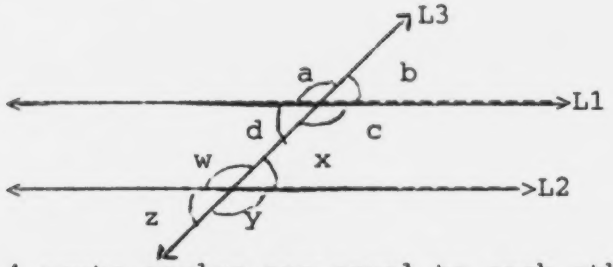


Given that $c = 65^\circ$, we know that: $a = 65^\circ$
$b = 115^\circ$
$d = 115^\circ$



$L1 \parallel L2$
and
$L3 \perp L1$

then L3 = transversal
and 8 right angles are
formed

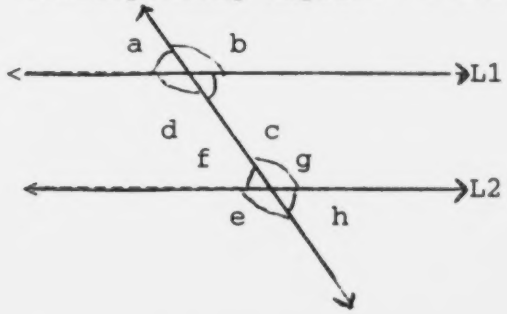


$L1 \parallel L2$
but
L3 is not $\perp$ L1

then 4 acute angles are equal to each other
and 4 obtuse angles are equal to each other

a= c= w= y and b= d= x= z

Alternate Interior Angles: d & x, c & w
Alternate Exterior Angles: a & y, b & z
Corresponding Angles: a & w, b & x, d & z, c & y



$L1 \parallel L2$
If $\angle c = 58^\circ$, find value of
$\angle f = ?$ (58°)
$\angle h = ?$ (58°)
$\angle g = ?$ (122°)

MATH III

Unit: Geometry

Lesson: Geometric Plane and Solid Figures

Lesson Objectives:

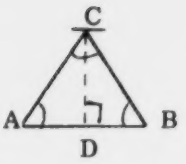
Upon completion of this lesson students will be able to:

1. Identify and define types of triangles.
2. Identify and define types of quadrilaterals.
3. Define a circle.
4. Define diameter and radius.
5. Identify and define geometric solids.
6. Find the diameter and radius of geometric figures.
7. Solve problems involving geometric figures.

LESSON 2:

Geometric Figures

Triangle - three sided plane figure



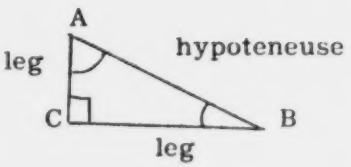
AB = base
CD = height
(perpendicular to base)

A + LB + LC = 180°

If angle A = 32°, and angle B = 88°

What is LC?

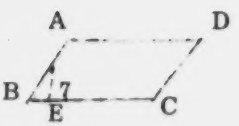
Right Triangle



Single LC = 90°
then LA + LB = 90°

If LB = 30°, what is LA?

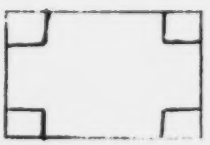
Quadrilateral - four-sided plane figure



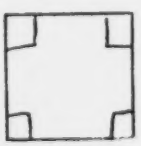
Parallelogram

has opposite equal parallel sides,
AE is called the height

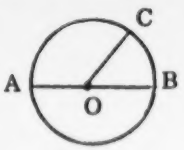
Rectangle - parallelogram with four right angles



Square - rectangle with four equal sides



Circle - plane figure in which all points are the same distance from point O, called the center.



Diameter - line segment goes through

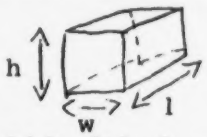
Radius - line segment from cent. O to point C

Diameter = 2 x Radius Radius = 1/2 Diameter

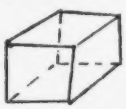
If D = 8" R = ? (4)

Geometric Solids - figures in space

Rectangular solid - solid whose all six faces are rectangles



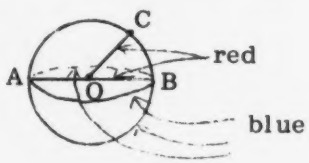
Cube - rectangular solid with 6 square faces



Sphere - all points are same distance from center

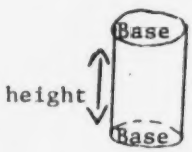
AB = diameter

OC = radius



If R = 3 m, then D = ? (6m)

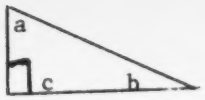
Cylinder



Bases are circles

Problem In Class

Right Triangle



La = 30 , Lb = ? 60°

LC = ? 90°

Triangles of a triangle are 42° and 103°
Find the measure of the 3rd angle. 35°

A circle has a radius of 8 cm. Find the diameter.

16 cm

MATH III

Unit : Geometry

Lesson: Perimeter

Lesson Objectives:

Upon completion of this lesson students will be able to:

1. Define perimeter and circumference.
2. Find the perimeter of geometric figures.
3. Find the perimeter of composite geometric figures.
4. Solve perimeter application problems.

LESSON 3:

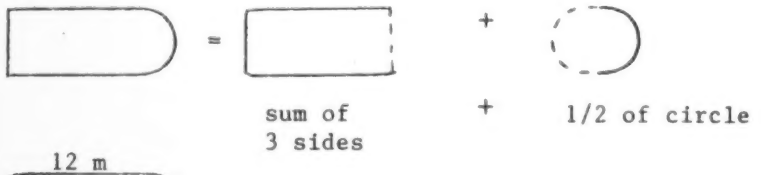
Perimeter - (singular units)
distance around a plane figure
Triangle = side 1 + side 2 + side 3
Square = 4 x side
Rectangle = 2 (length) + 2 (width)
Circle = Circumference = $2\pi r$ or πd

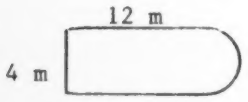
$\pi = \frac{22}{7}$ or 3.14

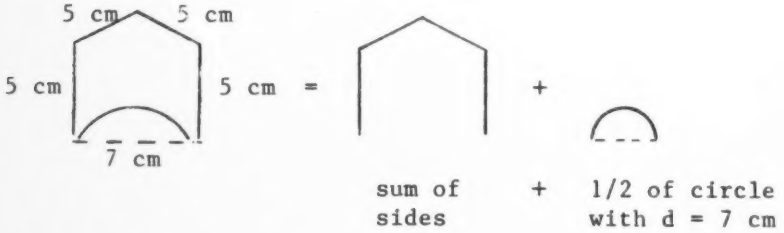
Find perimeter of a rectangle with a width of 2/3 ft. and a length of 2 ft.

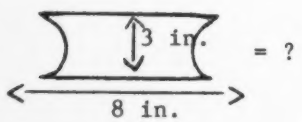
Find circumference of a circle with a radius of 18 cm.

Composite figures









MATH III

Unit:

Lesson: **Area and Volume**

Lesson Objectives:

Upon completion of this lesson students will be able to:

1. Define and demonstrate the ability to find the area and volume of geometric figures.
2. Demonstrate an understanding of square units and cubic units.
3. Solve area and volume application problems.
4. Solve area and volume problems involving composite figures.

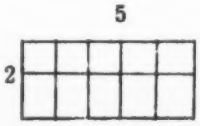
If fencing costs $2.75 /ft., how much will it cost to fence a rectangular lot 108 ft. wide x 240 ft. long?

A metal strip is installed around a workbench that is .74 m wide, 3 m lontg. At $1.76/m, how much does it cost? Round to nearest cent.

LESSON 4:

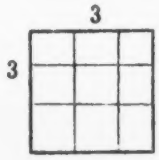
Area - amount of surface in a region (square units)

Rectangle = length x width



$= 10 \text{ in}^2$

Square = side x side
or side



$= 3 \text{ m}^2$

Circle = x radius

$= \pi 5^2$

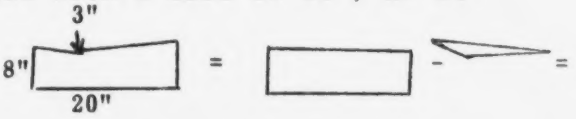
Triangle = 1/2 bh

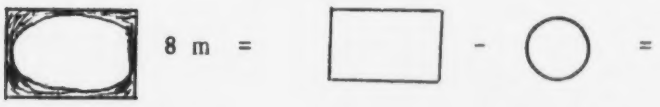
= 1/2 4.6 = 12 sq. in.

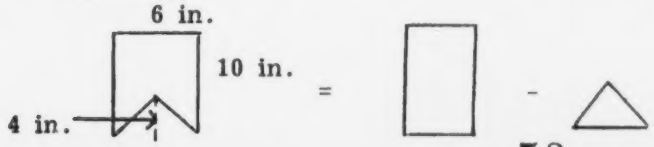
Find area of a circle with a diameter of 9 cm.

Find area of a triangle with a base of 24", h= 14"

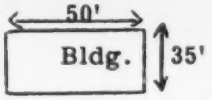
Composite figures







A walkway 2 m wide is built along both sides and the front of a building. Find the area of the walkway.



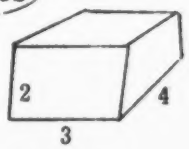
Bonus: New carpet is installed. Room measures 9' x 12'. Find the square yard of carpet needed.

Volume Amount of space in a closed surface.

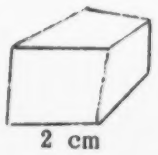
Cubic units

Rectangular Solid

= l.w.h
= 4.3.2
= 24 cu. ft.



Cube = s^3
= 2 cm.2 cm.2 cm
= 8 cm^3



Sphere = $\frac{4}{3}\pi r^3$

$= \frac{4}{3}.\frac{22}{7}.\frac{5}{1}.\frac{5}{1}.\frac{5}{1} =$

$= \frac{11000}{21}$

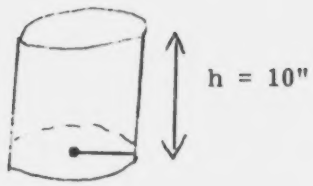
$= 523.33\ cm^3$

Cylinder = $\pi r^2 .h$

= $\pi 4^2 .10$

= (3.14)(16)(10)

= 502.40 $in.^3$



Find the volume of a rectangular solid with l=3', w=1.5', h=2`.

(9 $ft.^3$)

Find the volume of a cylinder with radius of 12 cm, h of 65 cm.

(29, 30, 0.4 $cm.^3$)

Find the volume of a sphere with a diameter of 12".

(904.32 $in.^3$)

Composite Geometric Solid

$\pi r^2.h + 1/2\ (4/3\ r^3)$

If r = 3", h = 10"

$[3.14.(3\ in.)^2.(10\ in.)] + 1/2.4/3.3.14.(3\ in.)^3]$

282.6 $in.^3$ + 56.52 $in.^3$

339.12 $in.^3$

MATH III

Unit: Geometry

Lesson: Pythagorean Theorem

Lesson Objectives:

Upon completion of this lesson students will be able to:

1. Define the Pythagorean Theorem.
2. Use a table to find the square root of a number.
3. Find the unknown side of a right triangle using the Pythagorean Theorem.
4. Solve application problems involving the Pythagorean Theorem.

8.5 Pythagorean Theorem

Area of a Square

$S^2 = (4in)(4in)$

$= 16in^2$

If Area of a Square = $36in^2$
then what is the length of a side?

Side = 6in

Square Root $\sqrt{36} = 6$
because $6 \cdot 6 = 36$

Perfect Squares	
$1 \cdot 1 = 1$	$\sqrt{1} = 1$
$2 \cdot 2 = 4$	$\sqrt{4} = 2$
$3 \cdot 3 = 9$	$\sqrt{9} = 3$
$4 \cdot 4 = 16$	$\sqrt{16} = 4$
$5 \cdot 5 = 25$	$\sqrt{25} = 5$
$6 \cdot 6 = 36$	$\sqrt{36} = 6$

Numbers that are not perfect squares

ie. 5, 10, 11, 14, etc.

use calculator!

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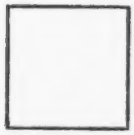
LESSON 5:

Pythagorean Theorem

Area of a Square

$S^2 = (4 \text{ in.})(4 \text{ in})$
$= 16 \text{ in.}^2$



If Area of a Square = 36 in.^2, then what is the length of a side?

Side = 6 in.

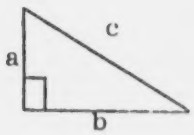
Square Root $\sqrt{36} = 6$
because $6.6 = 36$

Perfect Square

$1.1 = 1$	$\sqrt{1} = 1$
$2.2 = 4$	$\sqrt{4} = 2$
$3.3 = 9$	$\sqrt{9} = 3$
$4.4 = 16$	$\sqrt{16} = 4$
$5.5 = 25$	$\sqrt{25} = 5$
$6.6 = 36$	$\sqrt{36} = 6$

Numbers that are <u>not</u> perfect squares

i.e., 5, 10, 11, 14, etc.
use calculator!

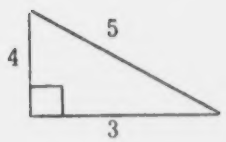


Right Triangle

Pythagorean Theorem:

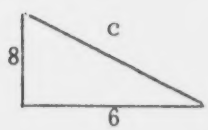
Square of Hypotenuse = Sum of square of two legs

$$C^2 = a^2 + b^2$$



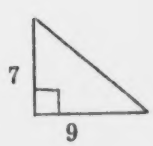
$$5^2 = 4^2 + 3^2$$

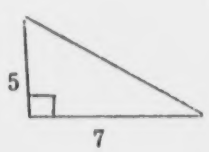
$$25 = 16 \quad 9$$

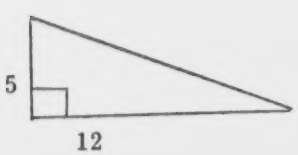


$$C^2 = 8^2 + 6^2$$
$$C^2 = 64 + 36$$
$$C^2 = 100$$
$$C = 10$$

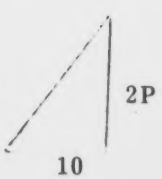
Find hypotenuse







Find the length of the ladder needed to reach a height of 20 ft. if the bottom of the ladder is placed 10' from the building.



$$C^2 = 10^2 + 20^2$$
$$C^2 = 100 + 400$$
$$C^2 = 500$$

MATH III

Unit: Geometry

Lesson: Similar Triangles

Lesson Objectives:

Upon completion of this lesson students will be able to:

1. Demonstrate an understanding of similar triangles.
2. Determine whether two given triangles are similar.
3. Determine whether two triangles are congruent.
4. Solve application problems involving similar triangles.

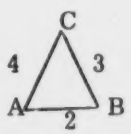
LESSON 6:

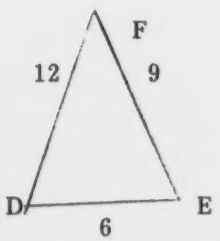
Similar Triangles

Similar Objects - same shape, different size baseball is similar to basketball model airplane is similar to airplane, etc.

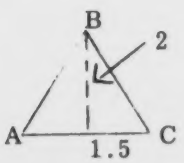
Two triangles are similar if the ratios of the corresponding sides are equal.

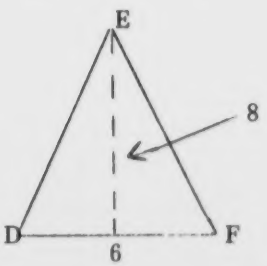
Triangle ABC is similar to DEF





$\frac{AB}{DE} = \frac{2}{6} = \frac{1}{3}$ $\frac{BC}{EF} = \frac{3}{9} = \frac{1}{3}$ $\frac{AC}{DF} = \frac{4}{12} = \frac{1}{3}$

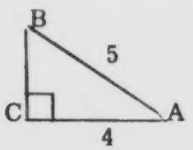


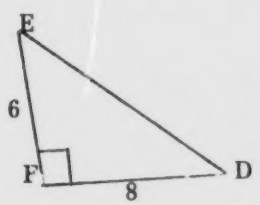


$\frac{1.5}{6} = \frac{6}{24}$ $\frac{2}{8} = \frac{6}{24}$

So Triangle ABC is similar to DEF

ABC is similar to DEF.
Find the perimeter of each triangle.



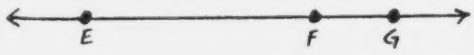


Worksheets for Geometry Unit

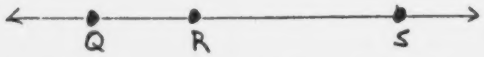
1. How many degrees are in one complete revolution?

2. How many degrees are in a straight angle?

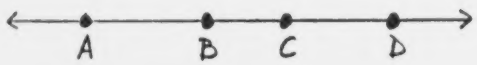
3. In the figure, EF = 18 and FG = 6. Find the length of EG.



4. In the figure, it is given that QR = 15 and QS = 45. Find the length of RS.



5. In the figure, it is given that AB = 21, BC = 14 and AD = 54. Find the length of CD.



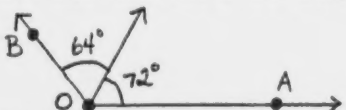
6. Find the complement of a 62 degree angle.

7. Find the supplement of a 162 degree angle.

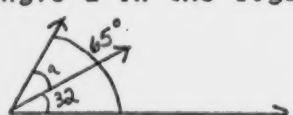
8. Find the complement of a 88 degree angle.

9. Find the supplement of a 7 degree angle.

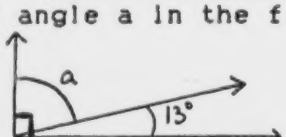
10. In the figure, find the measure of angle AOB.



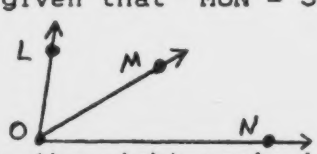
11. Find the measure of angle a in the figure.



12. Find the measure of angle a in the figure.



13. In the figure, it is given that MON = 38 degrees, and LON = 85 degrees. Find the measure of LOM.



14. Name the side opposite the right angle in a right triangle.

15. Name the rectangle with four equal sides.

16. Name the solid in which all points are the same distance from the center.

17. Name the plane figure in which all points are the same distance from the center.

18. Name the solid in which all the faces are rectangular.

19. A triangle has a 105 degree angle and a 32 degree angle. Find the measure of the other angle.

20. A right triangle has a 62 degree angle. Find the measure of the other two angles.

21. A triangle has a 30 degree angle and a 45 degree angle. Find the measure of the other angle.

22. Two angles of a triangle are 42 degrees and 105 degrees. Find the measure of the other angle.

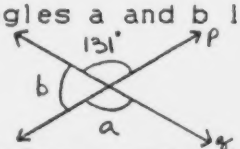
23. Find the radius of a circle with a diameter of 9 ft.

24. Find the diameter of a circle with a radius of 24 cm.

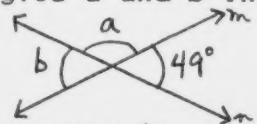
25. The radius of a sphere is 1 1/2 ft. Find the diameter.

26. The diameter of a sphere is 1.2 m. Find the radius.

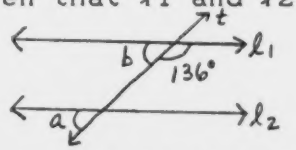
27. Find the measures of angles a and b in the figure.



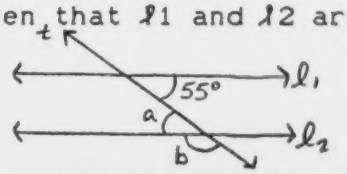
28. Find the measures of angles a and b in the figure.



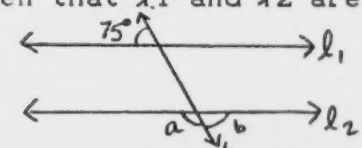
29. In the figure, it is given that $\ell 1$ and $\ell 2$ are parallel. Find the measures of angles a and b.



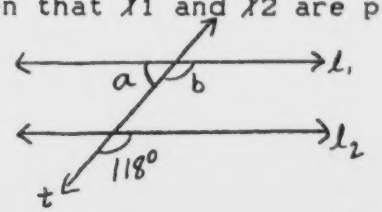
30. In the figure, it is given that $\ell 1$ and $\ell 2$ are parallel. Find the measures of angles a and b.



31. In the figure, it is given that $\ell 1$ and $\ell 2$ are parallel. Find the measures of angles a and b.

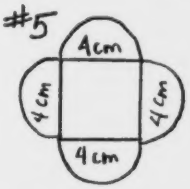


32. In the figure, it is given that $\ell 1$ and $\ell 2$ are parallel. Find the measures of angles a and b.

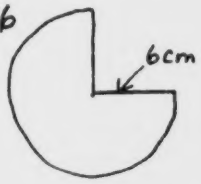


1. Find the perimeter of a triangle with sides 14 cm, 13 cm and 12 cm.
2. Find the perimeter of a square with sides equal to 2m.
3. Find the perimeter of a rectangle with a width of 5 ft and a length of 18
4. Find the circumference of a circle with a radius of 4 in.
5. Find the perimeter of this figure.
6. Find the perimeter of this figure.

#5

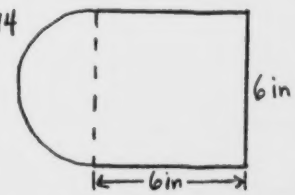


#6

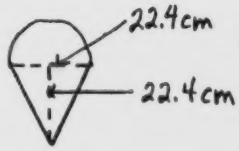


7. Find the amount of fencing needed to fence a farm that is 1 1/2 mi long and 3/4 mile wide.
8. Find the number of feet of framing needed to frame a picture that is 2 1/2 ft by 1 2/3 feet.
9. A tricycle tire has a diameter of 12 in. How many feet does the tricycle travel if the wheel mades 8 revolutions?
10. Find the area of a triangle with a base of 3 ft and a height of 2/3 ft.
11. Find the area of a square with a side of 10 cm.
12. Find the area of a rectangle with a length of 82 cm and a width of 20 cm.
13. Find the area of a circle with a diameter of 40 cm.
14. Find the area of the figure.
15. Find the area of the figure.

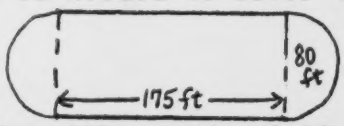
#14



#15



16. The telescope lens located on Mt. Palomar has a diameter of 200 in. Find the area of the lens.
17. An irrigation system waters a circular field that has a 50 ft radius. Find the area watered by the irrigation system.
18. Find the area of a 2 meter boundary around a swimming pool which measures 8 m by 5 m.
19. How much hardwood floor is needed to cover the roller rink shown in the figure?



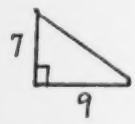
20. Find the volume of a cube with a side of 12 m.
21. Find the volume of a rectangular solid with a length of 8t, a width of 6 ft, and a height of 5 ft.
22. Find the volume of a sphere with a diameter of 7 in.
23. Find the volume of a cylinder with a diameter of 5 ft and height of 8 ft.
24. A rectangular tank at the fish hatchery is 9 m long, 3 m wide, and 1.5 m deep. Find the volume of the water in the tank when the tank is full.
25. A hot air balloon is in the shape of a sphere. Find the volume of a hot balloon that is 32 ft in diameter.
26. A silo, in the shape of a cylinder, is 16 ft in diameter and has a height of 36 ft. Find the volume of the silo.

Find the square root of each number. Use a calculator. **Worksheet** 4.24

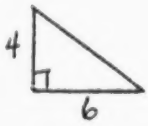
1. 34 2. 144 3. 64 4. 130

Find the unknown side of the triangle in the figures.

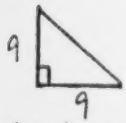
5.



6.

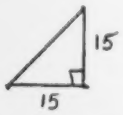


7.



Find the hypotenuse of the triangle in the figures.

8.

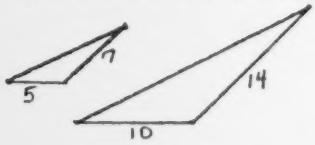


9.

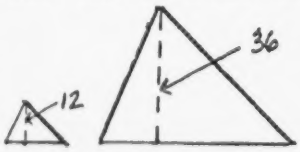
10. How long does a ladder need to be to reach a height of 13 feet on a building if it is placed 5 ft away from the building?

Find the ratio of corresponding sides for the similar triangles in the figures.

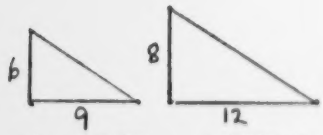
11.



12.



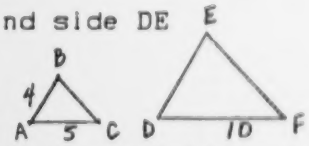
13.



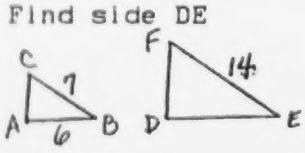
14.

Triangles ABC and DEF are similar. Find the indicated distance.

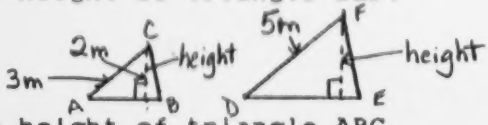
15. Find side DE



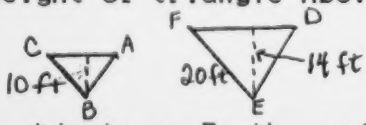
16. Find side DE



17. Find the height of triangle DEF.

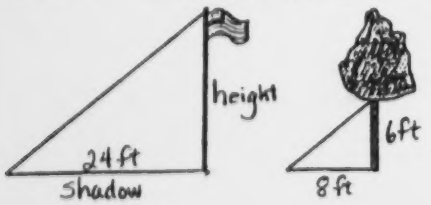


18. Find the height of triangle ABC.

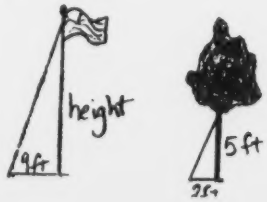


The sun's rays, objects on Earth, and the shadows cast by them form similar triangles. Find the height of the flagpoles shown.

19.



20.

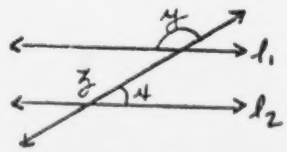


GEOMETRY QUIZ

1. Find the complement of a 32 degree angle.

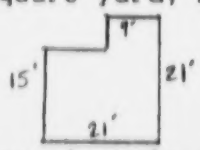
2. A right triangle has a 40 degree angle. Find the measure of the other two angles.

3. In the figure, $\ell 1$ and $\ell 2$ are parallel. x = 30 degrees. Find y.



4. Find the perimeter of a rectangle with a length of 2 m and a width of 1.4 m.

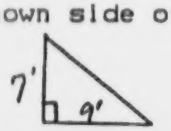
5. A carpet is to be placed as shown in the diagram below. At $15.00 per square yard, how much will it cost to carpet the area?



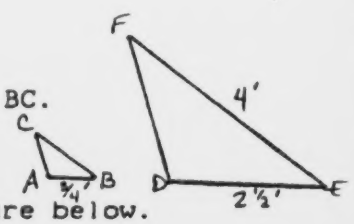
6. How much more pizza is contained in a pizza with a radius of 10 in than in one with a radius of 8 in?

7. Find the square root of 189.

8. Find the unknown side of the triangle shown in the figure.



9. Triangles ABC and DEF are similar. Find side BC.



10. Find the width of the canal shown in the figure below.